ERDC
Engineer Research and Development Center

Joint Rapid Airfield Construction

Enhanced Construction Technology

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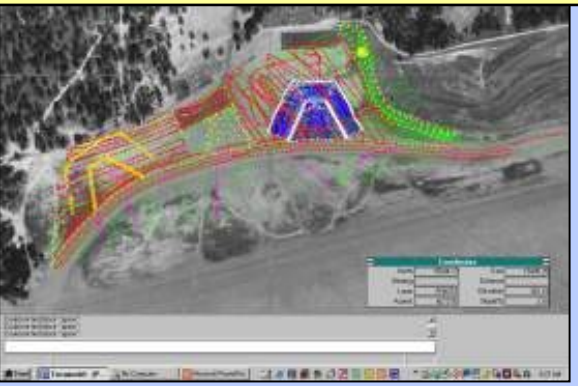
Enhanced Construction Technology

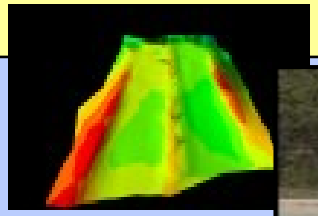
Joint Rapid Airfield Construction

- *Increase Overall Design and Construction Productivity with Reduced Logistical Foo*

➢ **Integrated Design and Construction Planning**



All Digital Process



Rapid Repair Materials

➢ **Expedient Construction Materials and Techniques**

GPS-Enhanced Earthmoving Systems

➢ **Rapid Quality Control**

Quality Control Testing

Automated

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Progress to Date: Integrated
Design and construction planni

- **Rapid Topographic Survey Technique**
  - RTK GPS Survey

- **Rapid Design Procedures**
  - Geometric – Pre packaged Design Geometries
  - Structural – On Site Materials Analysis

Ready to Begin Earthwork in as Little as 12 Hours!!

Reach Back Through TeleEngineering

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Expedient Construction

Integrated with Design Process so Transition is Seamless

Digital Process Provides Autonomous Blade Control and Eliminates Requirement for Grade stakes

- **Requirements of Enhanced Construction System**
  - **Rough Grade and Final Grade Control**
  - **Construction Monitoring**

Enhanced Construction Technology

Pulverizer Technology

Tine Type

Soil Stabilization Rotor

Combination Rotor

- Identification of Existing Equipment
- C130 Transportable
- Document Equipment Requirements Along with Procedures for Optimum Usage

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Progress to Date: Rapid and Accurate Quality Control

- **Traditional model of owner / contractor doesn't apply**
  - No clear definition of who is responsible for different tasks
- **Current methods don't address geospatial differences**
- **Introduction of C17 Aircraft demands a higher quality structure to meet mission requirements**

C-130 Aircraft

175,000-lb

Contingency Tire Pressure = 100 psi

C-17 Aircraft

447,000-lb

Contingency Tire Pressure = 120 psi

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JRAC Quality Assurance Software

Project Boundary

Location (ft)

	N	E
Add	2500.01	1750.36
Remove		

Units of Measure

lb / ft³

Target Values

	Lower	Off	Upper	Off
Marginal	96.5	☐		☐
Unacceptable	92.5			

Percent Marginal Allowed 5.0

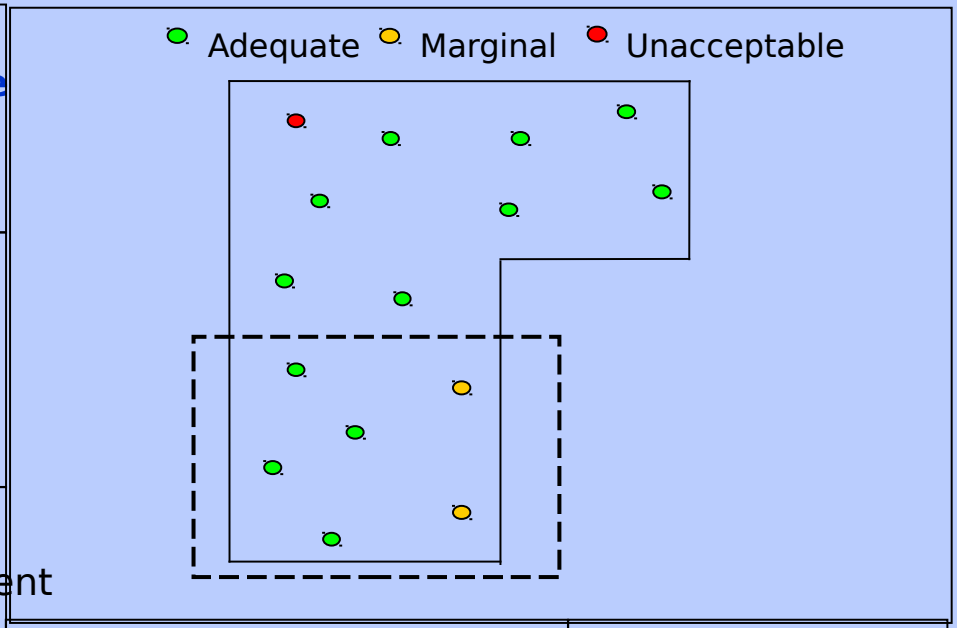
Test Results

	Location (ft) N	Location (ft) E	Measurement
Add	1813.75	1205.14	101.2
Remove			

Statistics for Selected Region

Area (sq.yd.) 1283.6

Quantity of Tests 6



Predicted Quality of Selected Region

Percent Adequate	82.0
Percent Marginal	12.5
Percent Unacceptable	5.5

Summary of Sufficiency

Quantity of Tests

Test Spacing

Material Quality

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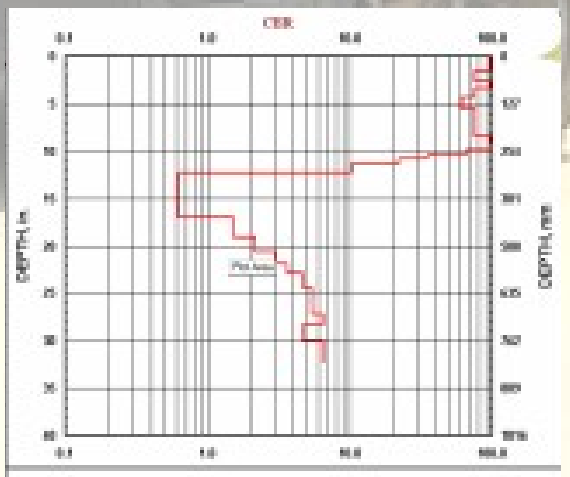
’04 Demo:

- **Raven:**
  - Rapid Topographic Data Collection (RTK GPS Survey)
  - On Site Soil Testing and Design Capability
  - Automated DCP
  - Rapid Data Transmission
  - Fully Autonomous Operation
  - Automated Reconnaissance Capability



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'04 Demo:

- **Enhanced Construction Capibility**
  - Site Vision GPS Operating on Three Pieces of Construction Equipment
  - Horizontal and Vertical Quality Control Provided through RTK GPS
- **T / Stab**

Enhanced Construction Technology

Products:

- New Methodology for Rapid Airfield Construction (all-digital process)
- Identification of Enhanced Construction System Requirements
- Identification of Pulverizer / Mixer Requirements
- Rapid Soil Testing Procedures (Identification, Moisture, Density, Strength)